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3504/1 e

## NEW COLOR FILTER GLASSES

RECEIVED

Part I

MAR 14 1968

### New Developments, Improvements, New Designations

### GROUP 250

Changes with regard to Color Filter Glass Catalog No. 365 e relate to those glasses having a transmission range above a sharp cut and extending in general up to about  $3 \mu$ . These glasses belonging to the WG-, GG-, OG- and RG groups form a range of 31 sharp cuts equally spaced over the spectral region from 230 to 1000 nm. Because the position of the "cut" is particularly important to these glasses, the wavelength giving internal transmittance 0,50 at 3 mm thickness has been chosen as a characteristic figure for a new and useful designation. The usual letters together with these wavelength values form the new type numbers, such as WG 230, GG 435 and RG 1000.

Important new developments are the glasses **GG 400** and **RG 780**, i. e. two glasses cutting at the limits of the visible spectral region.

Several glass types have been considerably improved with regard to transmission curve and glass quality. The existing types of temperature colored glasses having sharp cuts, as well as the infra-red transmitting black glasses are detailed in the second part of this leaflet. This second part now gives the revised position of pages 22 and 23 of catalog 365 e.

The first part of this leaflet on the following two pages gives information on new developments and new designations of the WG and GG types as per pages 30 and 31 of catalog 365 e, these types cutting sharply in the ultra-violet region from 230 to 395 nm. The table shown overleaf gives the  $\lambda_H$ -values for thicknesses of 1 mm, 2 mm and 3 mm. The curves are for thickness 1 mm as in catalog 365 e.

An important new filter glass is **WG 280** showing less variation in the transmission curve when exposed to strong UV-irradiation than can be observed with glasses WG 230 and WG 295 designated with a "V".

In the near future a new type having the shortest cut at about 220 nm (thickness 3 mm) will be entered into the manufacturing program. It will have a considerably better chemical stability than glass type WG 10, which is no longer produced.

As the transmission curves of the filter glasses WG 1 and GG 18 do not differ significantly, only **GG 18** will be produced in future. The glasses of the WG group cutting at various points are used in the UV, whereas the cerium glasses **GG 375**, **GG 385** and **GG 395** (formerly GG 18, GG 13 and GG 22) are suitable as UV blocking filters. Furthermore, cerium glasses have the additional advantage of being resistant to browning under gamma-radiation.

Glass type FG 10 has not been included in the range of sharp cut filters. It remains listed on page 35 with the glasses having a less sharp cut, but very low fluorescence.

The values of the cut wavelength  $\lambda_H$  relate to a temperature of 20 °C. Transmittance and cut wavelength, particularly with temperature colored glasses depend upon temperature. The table on page 4 lists the temperature coefficients of transmission for all the glass types mentioned in this leaflet.

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**Colored Glass Group: Colorless glasses having sharp cuts in the spectral region from 230 to 395 nm**

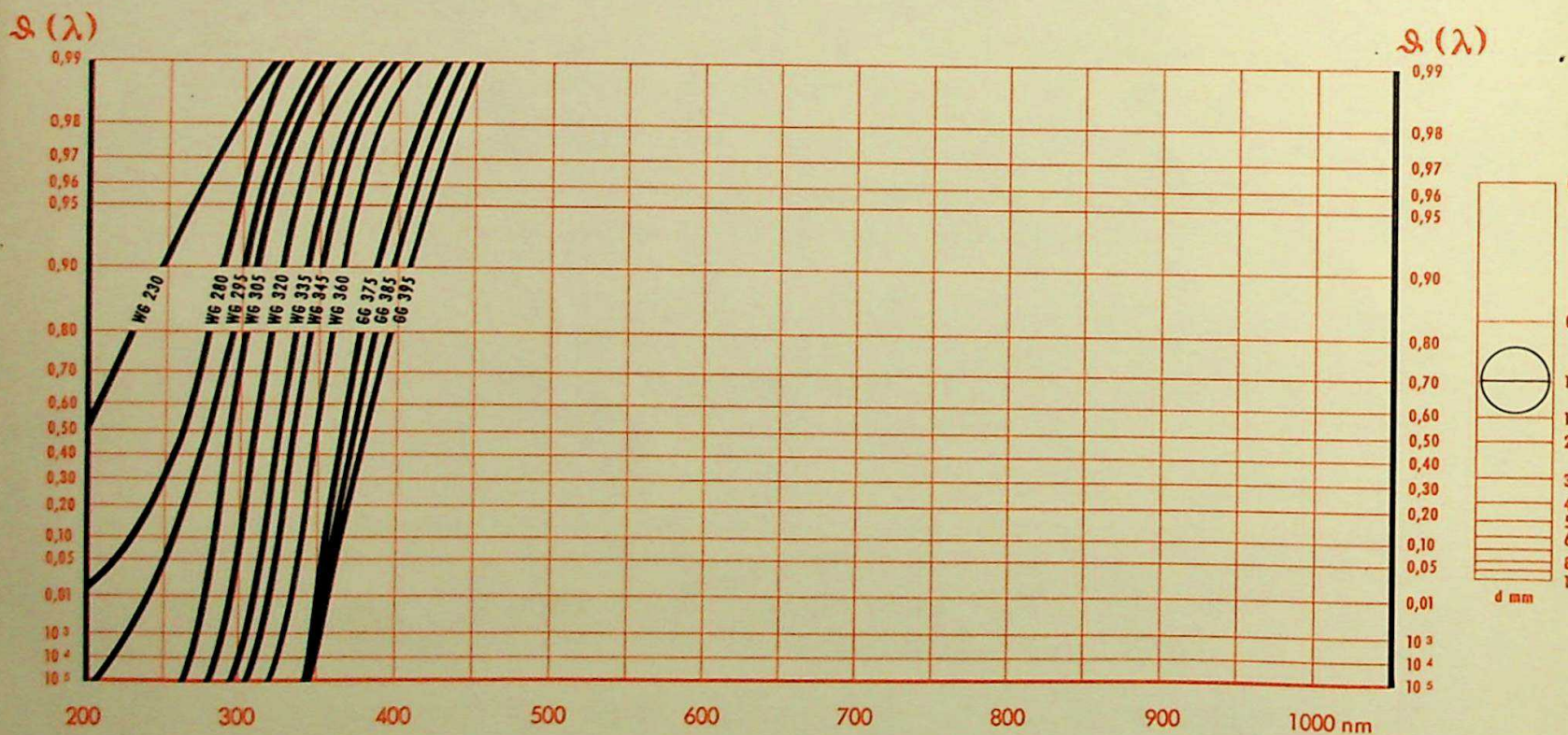
30 and 31  
new

Glass type new Designation	old	Remarks	approximate cut location $\lambda_H$ in nm at thickness			Specific gravity $s$	H Stability	Refractive index $n_d$	Correction factor $P_d$	Thickness appli- cable to trans- mission curve mm
			1 mm	2 mm	3 mm					
<b>WG 230*</b>	WG 8	V	198	218	230	2,83	④	1,53	0,915	1
<b>WG 280</b>			263	274	280	2,45	①	1,49	0,925	1
<b>WG 295</b>	WG 7	V	278	289	295	2,52	①	1,52	0,92	1
<b>WG 305</b>	WG 6		294	300	305	2,38	①	1,52	0,92	1
<b>WG 320</b>	WG 5		310	316	320	3,02	①	1,55	0,91	1
<b>WG 335</b>	WG 4		324	331	335	3,62	①	1,64	0,89	1
<b>WG 345</b>	WG 3		335	341	345	4,02	①	1,65	0,885	1
<b>WG 360</b>	WG 2		350	356	360	3,72	①	1,65	0,885	1
<b>GG 375</b>	GG 18		365	371	375	2,62	②	1,52	0,92	1
<b>GG 385</b>	GG 13		372	380	385	3,22	②	1,58	0,905	1
<b>GG 395</b>	GG 22		378	388	395	3,59	②	1,62	0,895	1

V = Change of transmission curve under UV-irradiation

$\lambda_H$  = Wavelength giving internal transmittance 0,50

\* = Variation of "cut" position from melt to melt up to  $\pm 15$  nm



Internal transmittance for wavelengths from 1 to 3  $\mu$  as per IR-table on the following page.



# IR-TABLE

Glass type	Thickness mm	Internal transmittance $\vartheta(\lambda)$ for $\lambda$ in $\mu$										
		1,0	1,2	1,4	1,6	1,8	2,0	2,2	2,4	2,6	2,8	3,0
WG 230	1	1,00	1,00	0,99	0,98	0,96	0,92	0,87	0,79	0,70	0,61	0,51
WG 280	1	1,00	1,00	1,00	1,00	1,00	1,00	0,99	0,98	0,97	0,48	0,48
WG 295	1	1,00	1,00	1,00	0,99	0,99	0,99	0,98	0,97	0,95	0,90	0,54
WG 305	1	1,00	1,00	1,00	0,99	0,99	0,99	0,98	0,97	0,94	0,88	0,65
WG 320	1	1,00	1,00	1,00	0,99	0,99	0,99	0,99	0,98	0,97	0,94	0,79
WG 335	1	1,00	1,00	1,00	1,00	0,99	0,99	0,99	0,98	0,98	0,96	0,79
WG 345	1	1,00	1,00	1,00	1,00	1,00	1,00	0,99	0,99	0,98	0,96	0,80
WG 360	1	1,00	1,00	1,00	1,00	1,00	1,00	0,99	0,99	0,98	0,96	0,81
GG 375	1	1,00	1,00	1,00	1,00	1,00	0,99	0,99	0,97	0,94	0,87	0,64
GG 385	1	0,99	0,99	0,99	0,99	0,99	0,99	0,99	0,98	0,95	0,88	0,68
GG 395	1	0,99	0,99	0,99	0,99	0,99	0,99	0,99	0,99	0,96	0,90	0,72

## Special Note

The curves shown in this leaflet relate to those thicknesses which permit particularly good observation of the course of the transmission curves. However, customers are free to order those thicknesses which are best suited to their purposes. For this reason, color filter glasses are made to order. It is necessary, therefore, to specify size and thickness in orders and inquiries. For technical reasons we recommend that the glasses are used with a minimum thickness of 2 mm.

The temperature coefficients of transmission for the sharp cut glasses mentioned in leaflets 3504/I e and II e are listed in the table on the following page.



## Temperature Coefficient of Transmission

The following table lists average values for the change of  $\lambda_H$ -value  $\Delta\lambda_H$  in nm for temperature increase of 1 °C in the range from 10 °C to 90 °C.

Type	$\Delta\lambda_H$
WG 230	0,02
WG 280	0,02
WG 295	0,03
WG 305	0,03
WG 320	0,05
WG 335	0,06
WG 345	0,07
WG 360	0,08
GG 375	0,06
GG 385	0,07
GG 395	0,08
GG 400	0,07
GG 420	0,07
GG 435	0,07
GG 455	0,08
GG 475	0,09
GG 495	0,10
OG 515	0,11
OG 530	0,12
OG 550	0,13
OG 570	0,14
OG 590	0,15
RG 610	0,16
RG 630	0,17
RG 645	0,17
RG 665	0,17
RG 695	0,18
RG 715	0,18
RG 780	0,22
RG 1000	0,38
RG N9	0,07



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